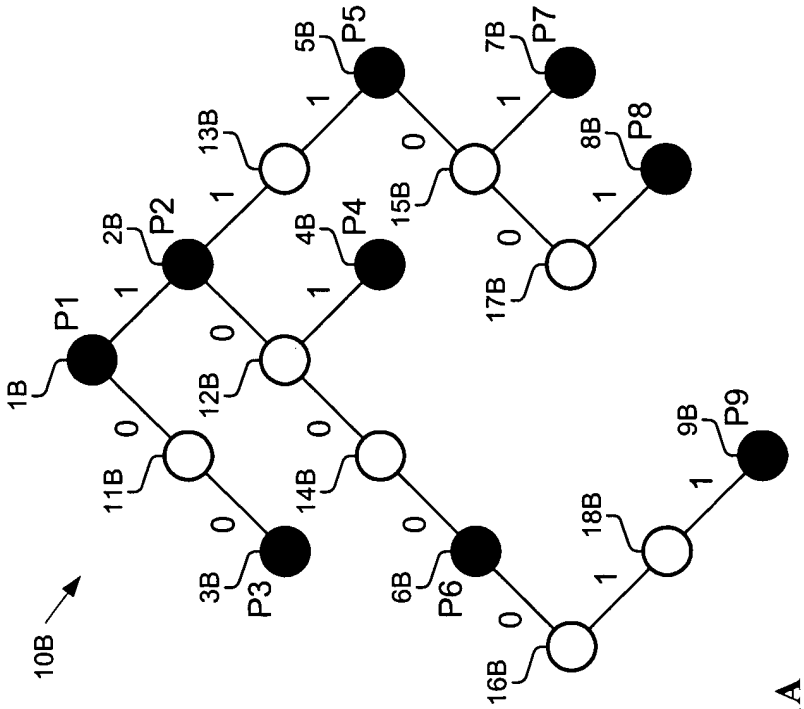
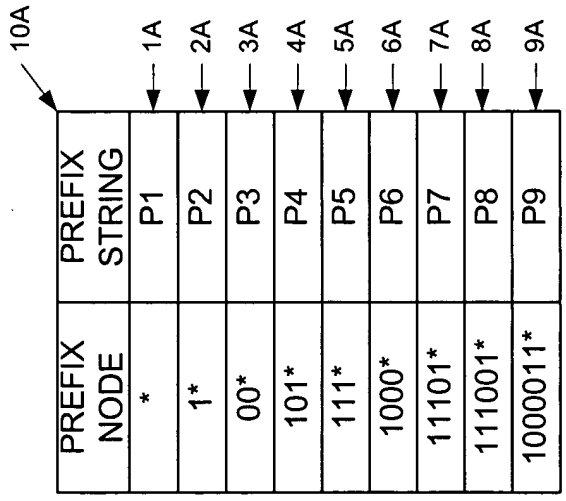




PREFIX NODE	PREFIX STRING
*	P1
1*	P2
00*	P3
101*	P4
111*	P5
1000*	P6
11101*	P7
111001*	P8
1000011*	P9

FIGURE 1A
PRIOR ART

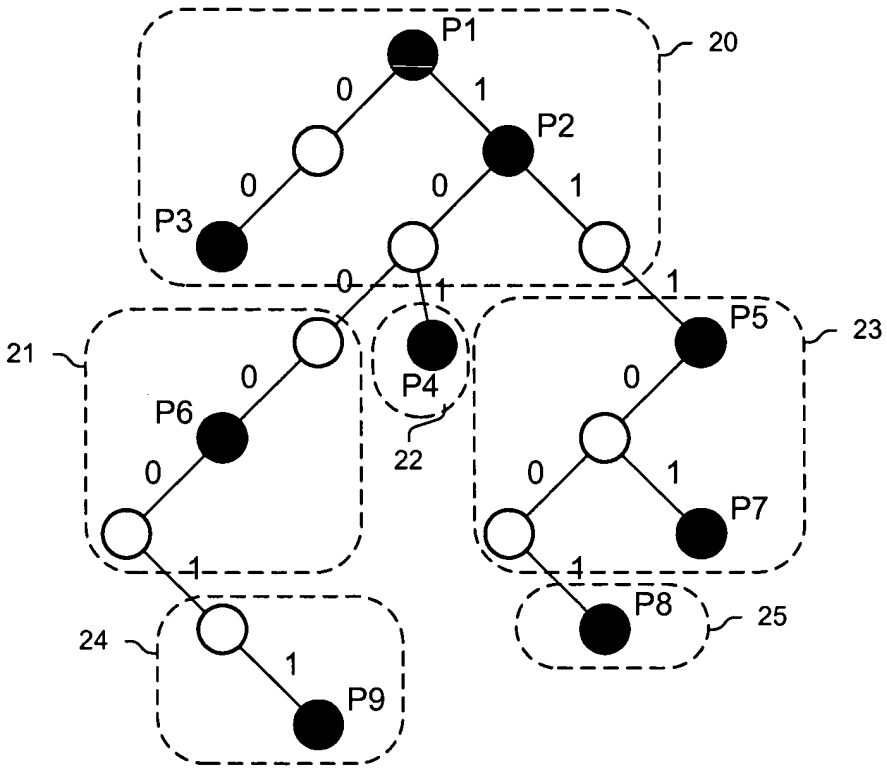


FIGURE 1B
PRIOR ART

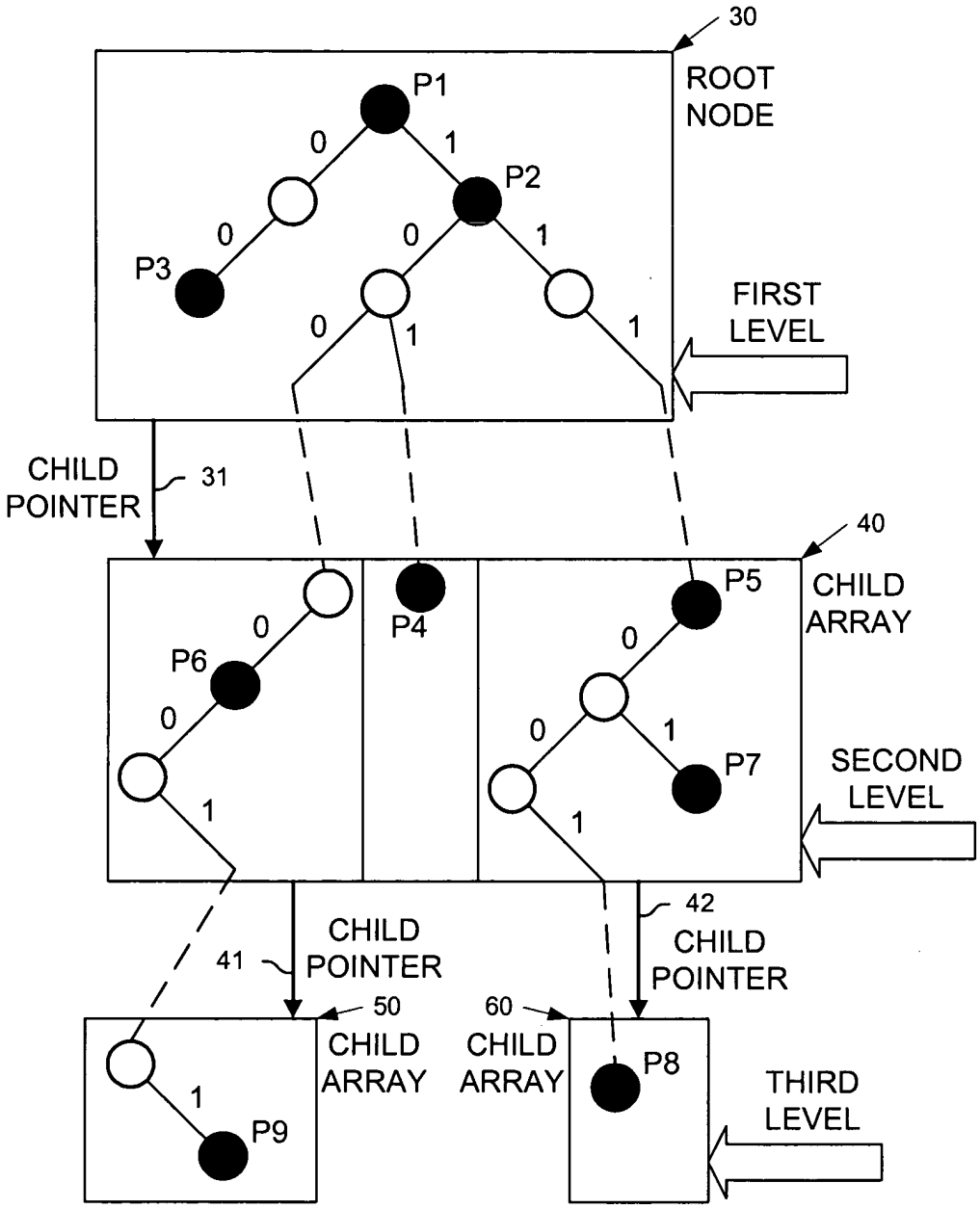


FIGURE 1C
PRIOR ART

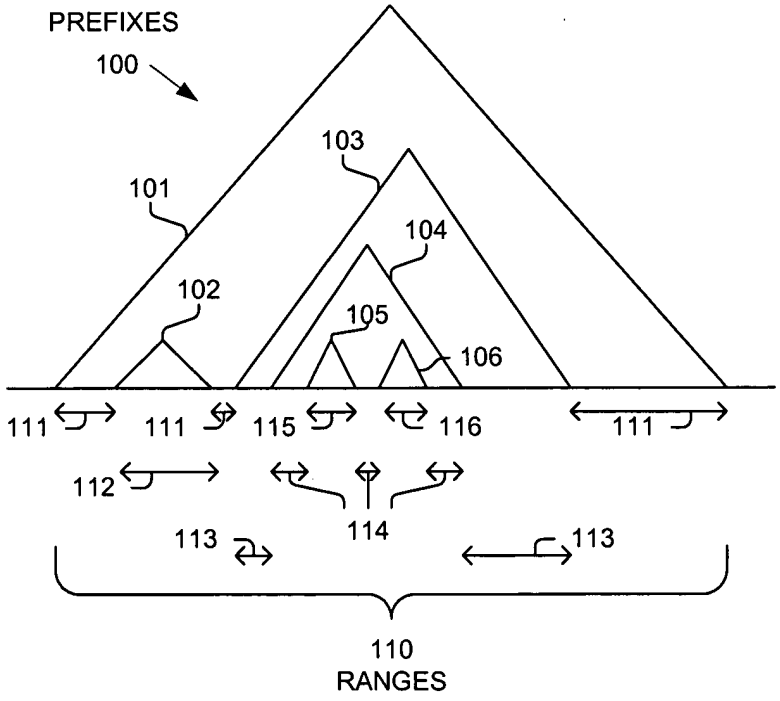


FIGURE 1D
PRIOR ART

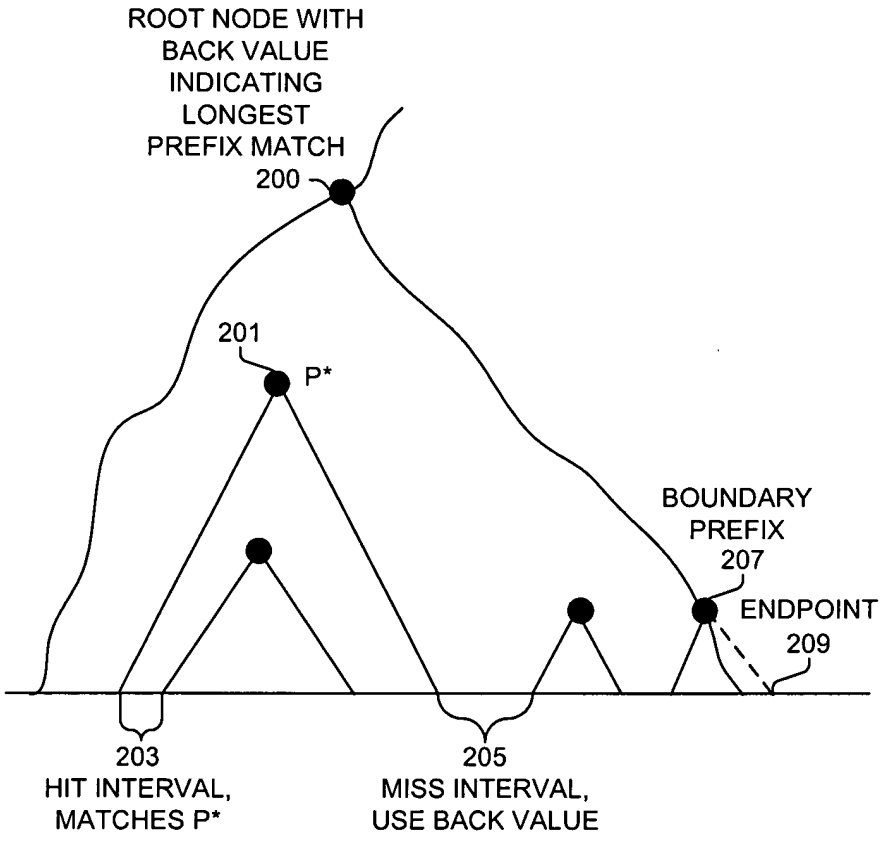

ROOT NODE WITH BACK VALUE INDICATING LONGEST PREFIX MATCH
200
201
P*
BOUNDARY PREFIX
207
ENDPOINT
209
203
HIT INTERVAL, MATCHES P*
205
MISS INTERVAL, USE BACK VALUE

FIGURE 2A

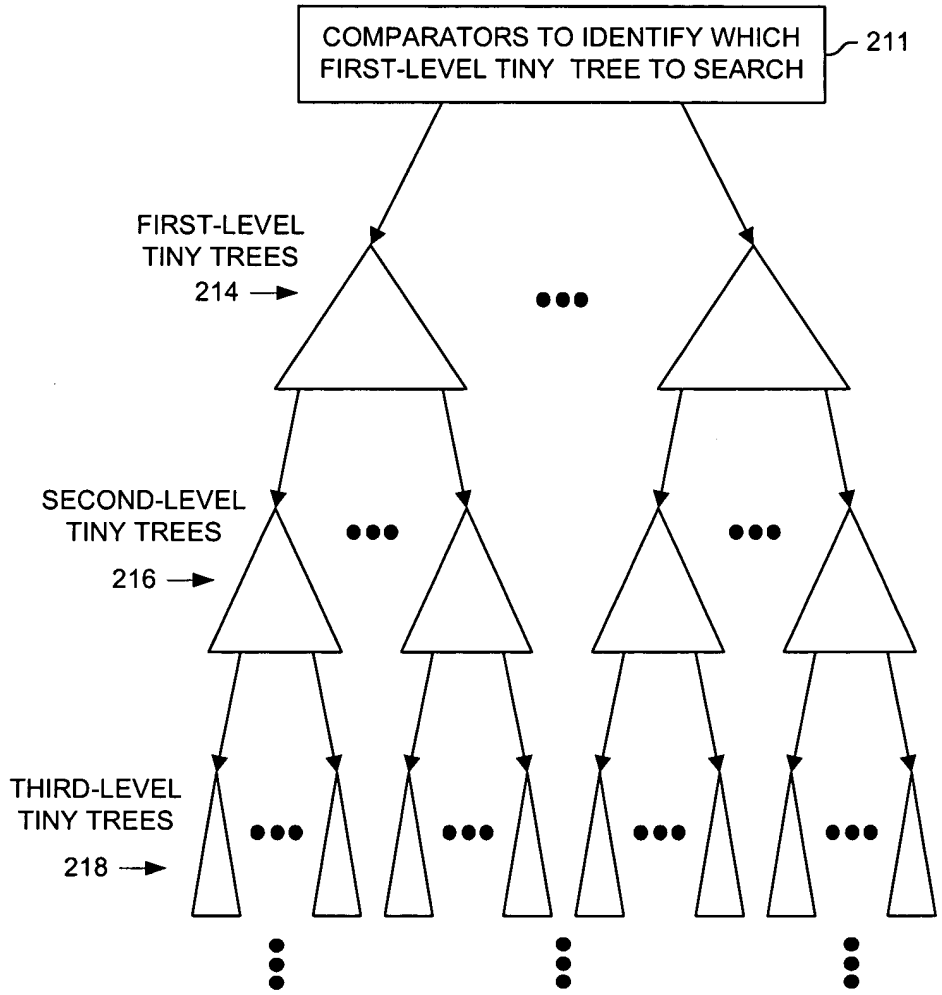

COMPARATORS TO IDENTIFY WHICH FIRST-LEVEL TINY TREE TO SEARCH
211
FIRST-LEVEL TINY TREES
214
SECOND-LEVEL TINY TREES
216
THIRD-LEVEL TINY TREES
218

FIGURE 2B

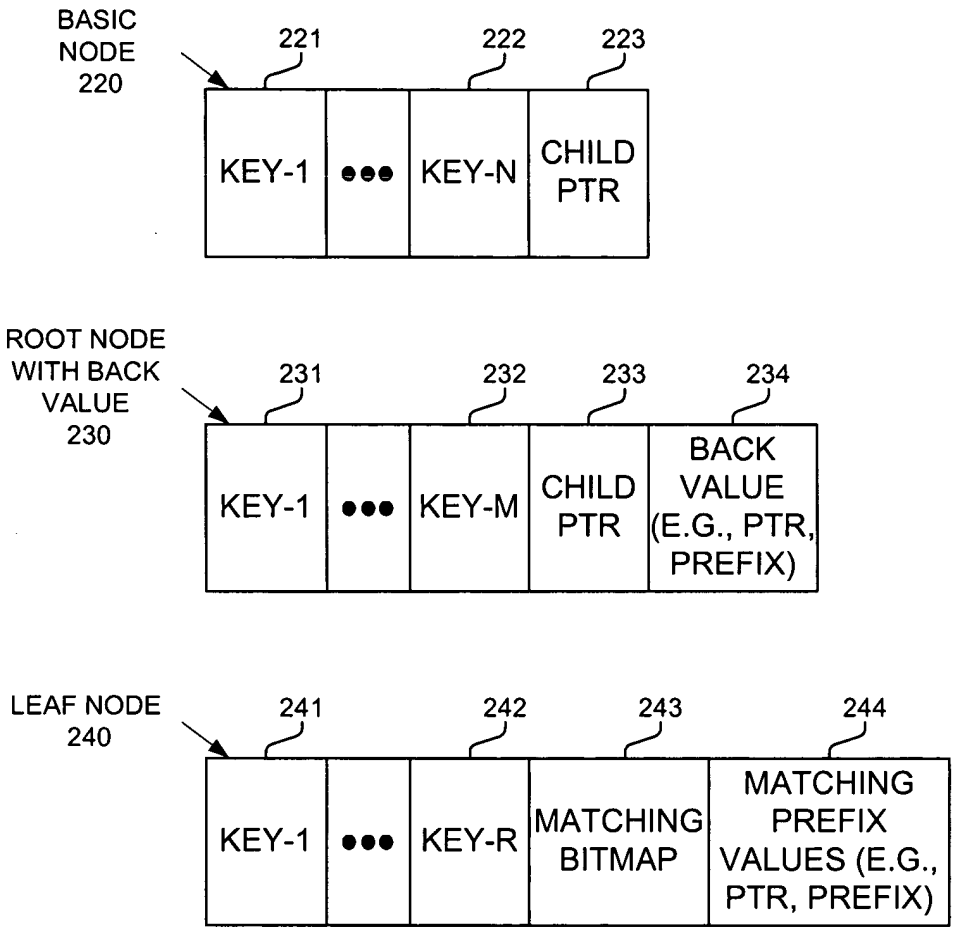

BASIC NODE 220
221
222
223
KEY-1
KEY-N
CHILD PTR
ROOT NODE WITH BACK VALUE 230
231
232
233
234
KEY-1
KEY-M
CHILD PTR
BACK VALUE (E.G., PTR, PREFIX)
LEAF NODE 240
241
242
243
244
KEY-1
KEY-R
MATCHING BITMAP
MATCHING PREFIX VALUES (E.G., PTR, PREFIX)

FIGURE 2C

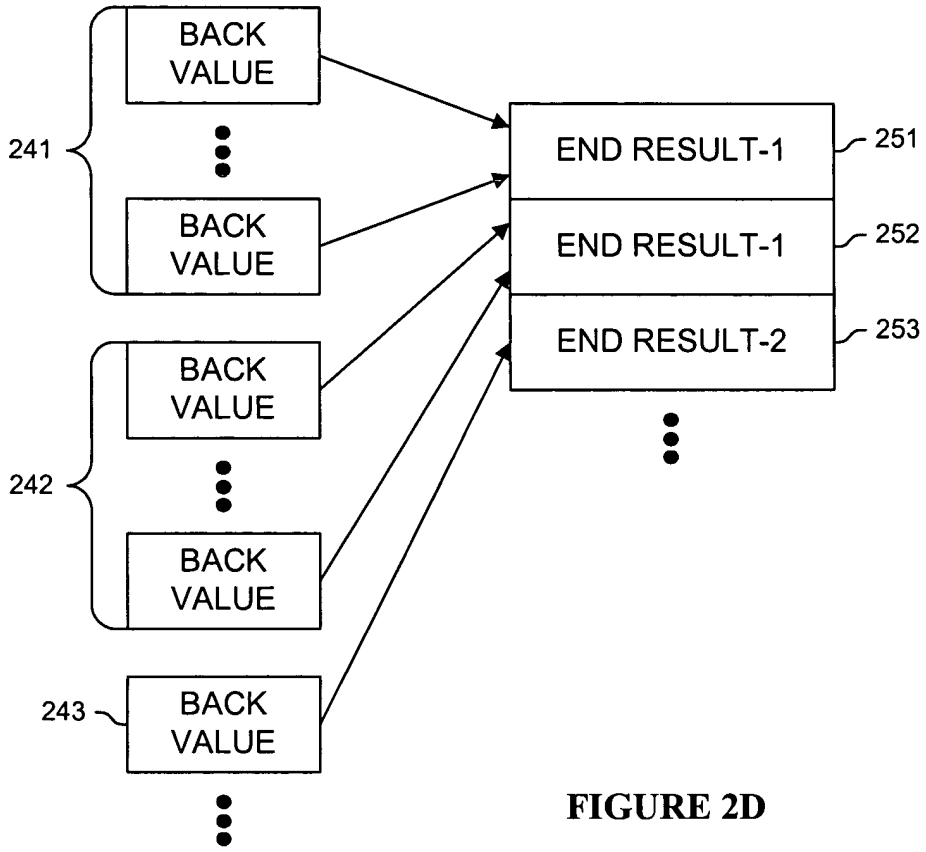

BACK VALUE
241
BACK VALUE
BACK VALUE
242
BACK VALUE
243
BACK VALUE
END RESULT-1
251
END RESULT-1
252
END RESULT-2
253

FIGURE 2D

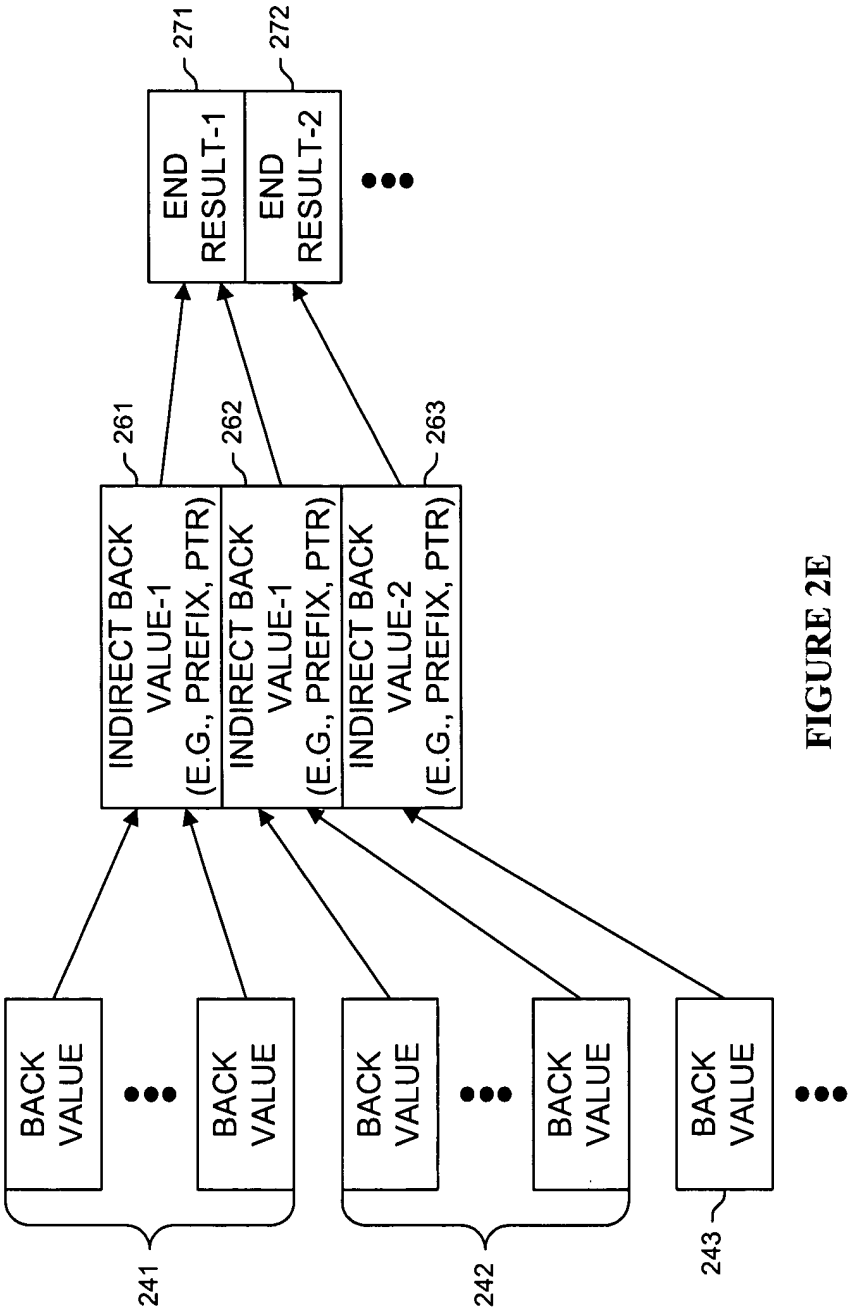
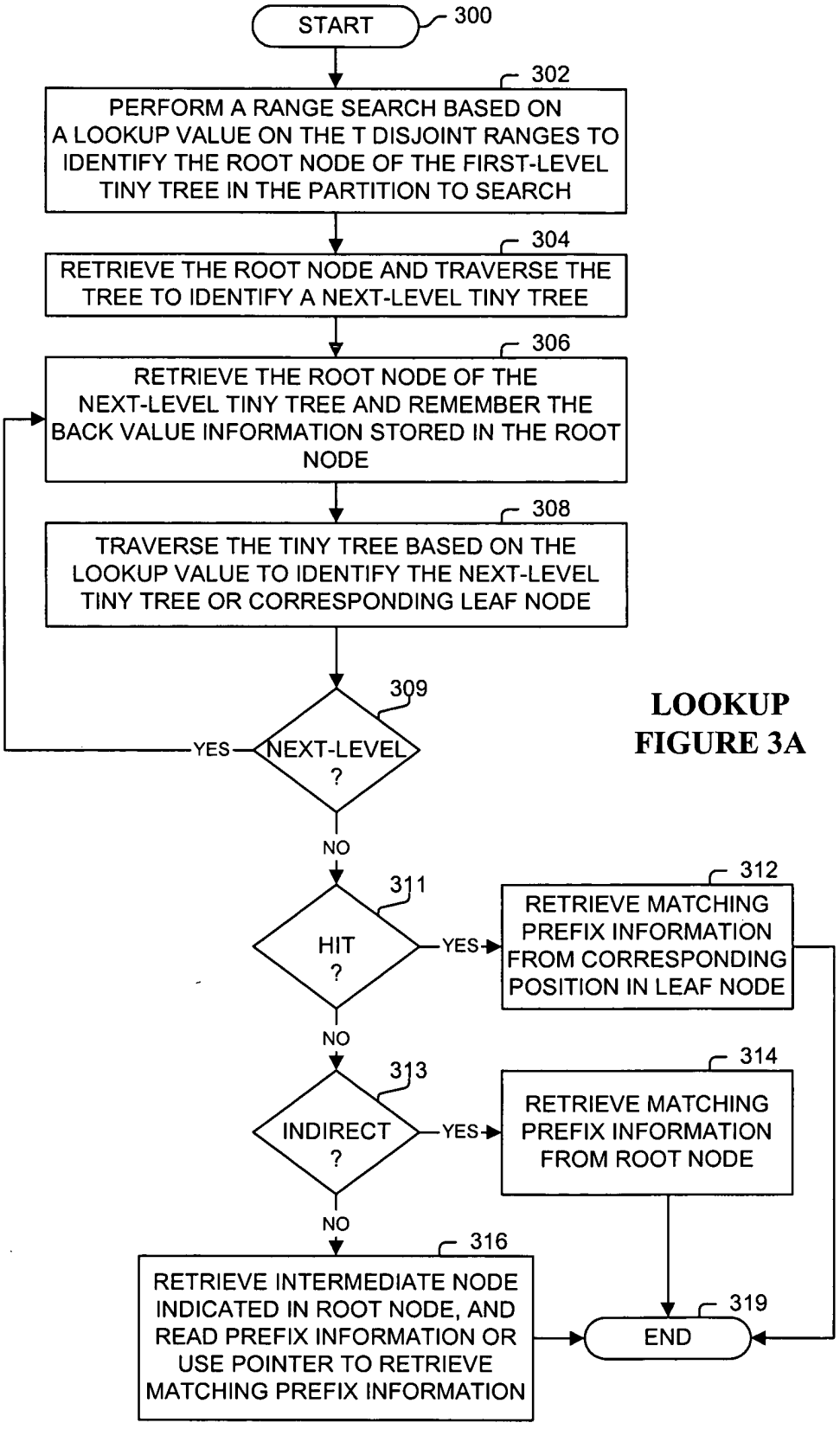
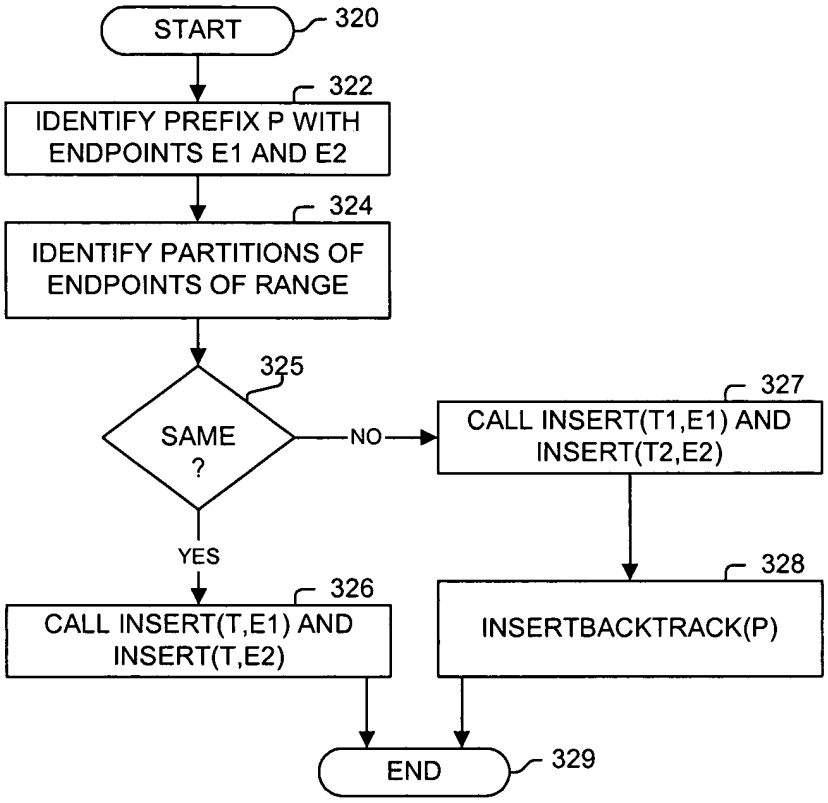

271
272
END RESULT-1
END RESULT-2
261
262
263
INDIRECT BACK VALUE-1 (E.G., PREFIX, PTR)
INDIRECT BACK VALUE-1 (E.G., PREFIX, PTR)
INDIRECT BACK VALUE-2 (E.G., PREFIX, PTR)
BACK VALUE
BACK VALUE
BACK VALUE
BACK VALUE
BACK VALUE
241
242
243

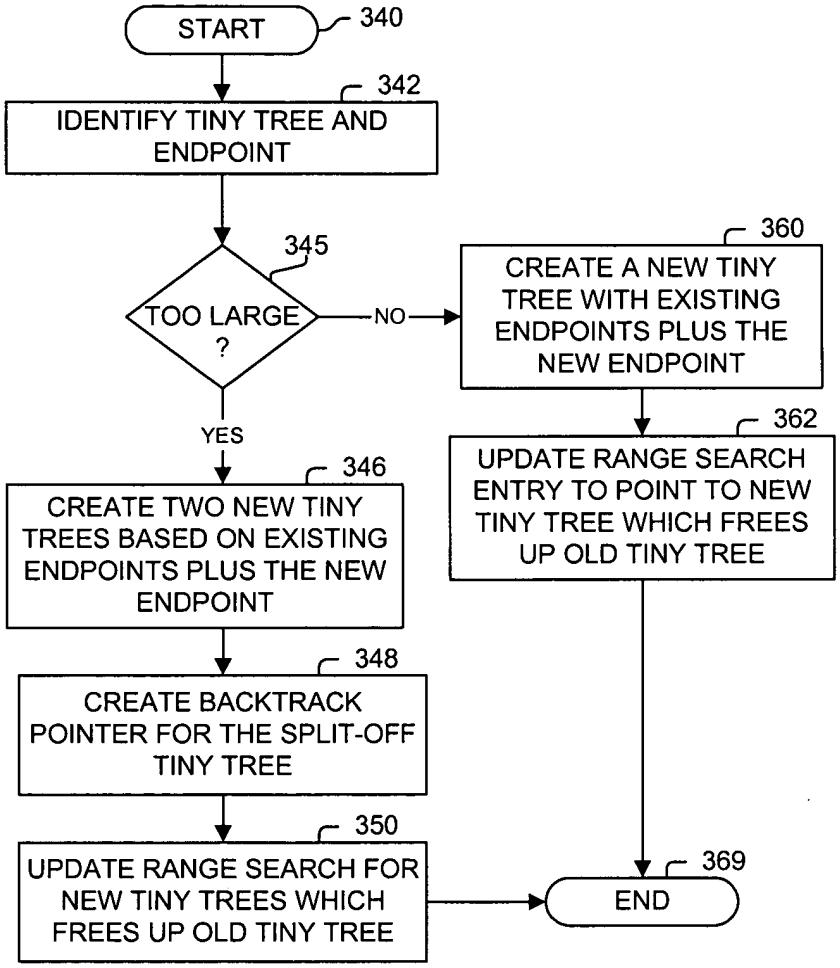
FIGURE 2E



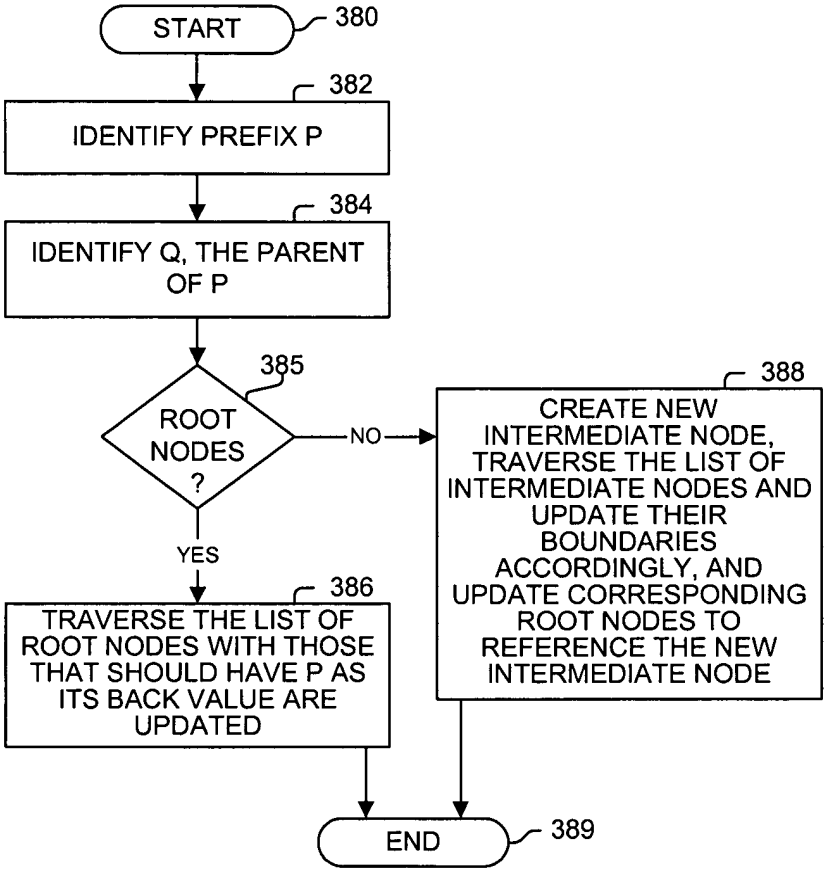
LOOKUP
FIGURE 3A



ADD ENDPOINT
FIGURE 3B



INSERT
FIGURE 3C



UPDATE BACK VALUES
FIGURE 3D

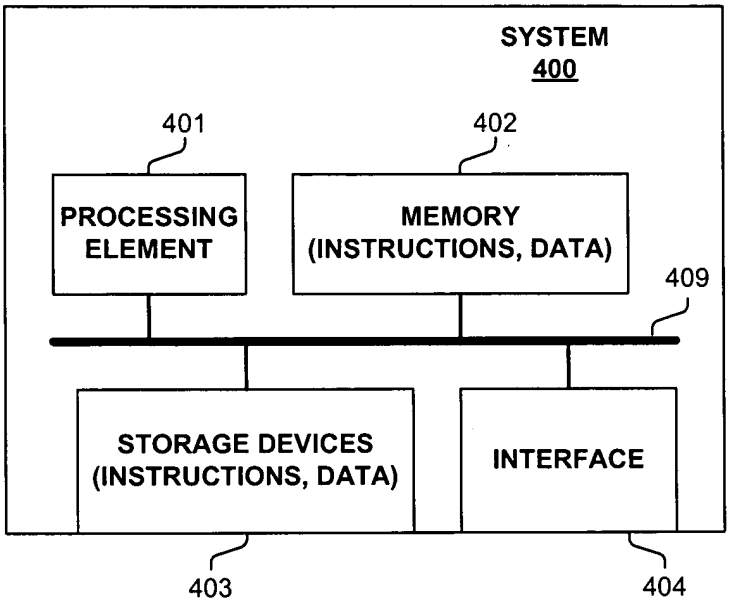

SYSTEM
400
401
402
PROCESSING ELEMENT
MEMORY (INSTRUCTIONS, DATA)
409
STORAGE DEVICES (INSTRUCTIONS, DATA)
INTERFACE
403
404

FIGURE 4A

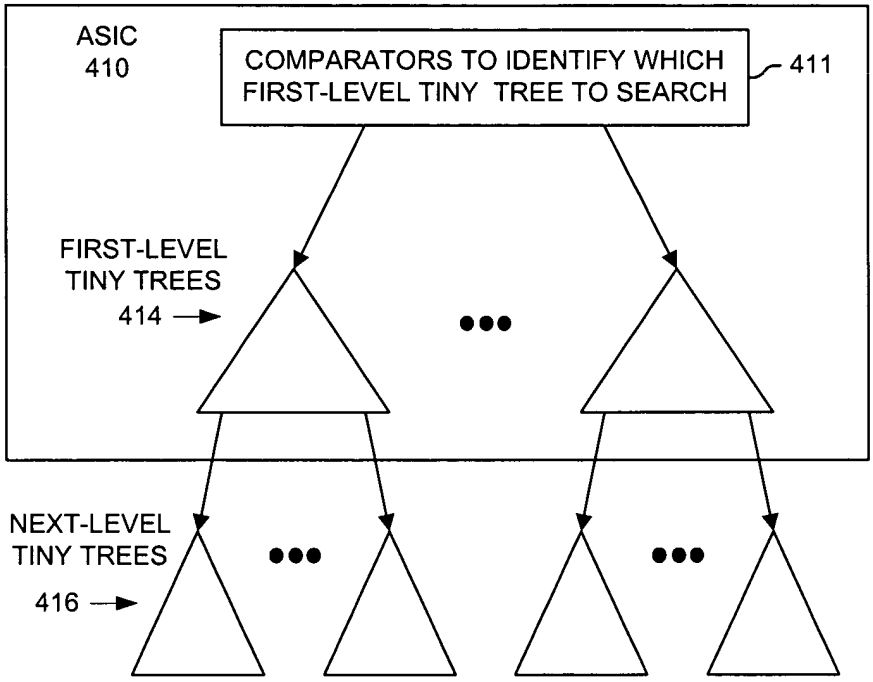

ASIC
410
COMPARATORS TO IDENTIFY WHICH
FIRST-LEVEL TINY TREE TO SEARCH
411
FIRST-LEVEL
TINY TREES
414
NEXT-LEVEL
TINY TREES
416

FIGURE 4B

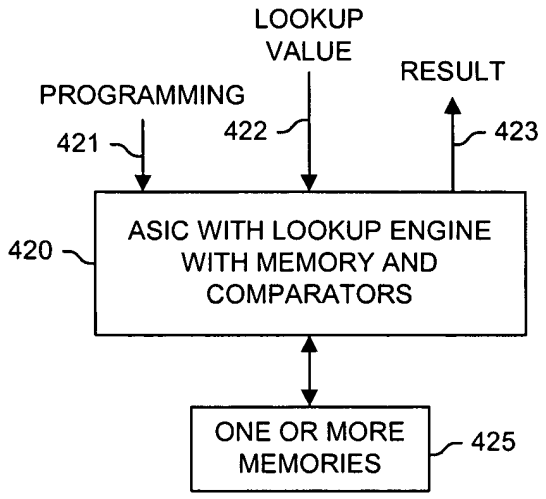


FIGURE 4C

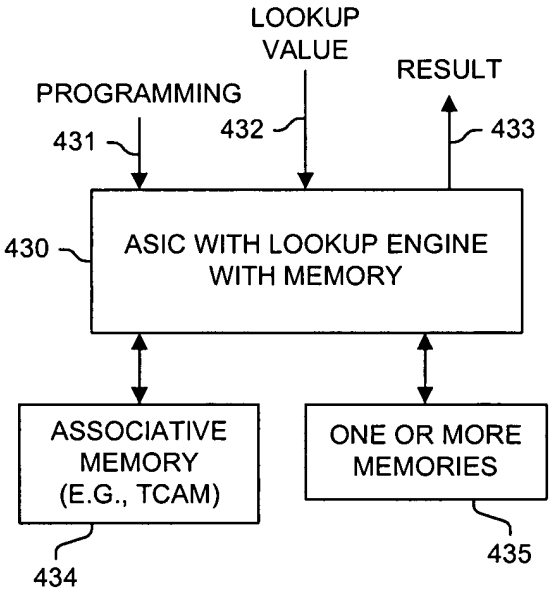


FIGURE 4D